REMARKS/ARGUMENTS

I. Summary of Office Action

In the Office Action dated December 8, 2004, Claims 1-20 and 27-37 are pending. The previous rejections have been withdrawn. Claims 1-20 and 27-28 are rejected under 35 U.S.C. § 112, second paragraph. Claims 1-3, 8-9, 16, 27-28, and 31 are rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,709,160 to Ward, et al. Claims 4-6, 10-12, 17-19, and 34-36 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ward, et al. in view of design choice. Claims 7, 13, 20, and 37 are rejected under 35 U.S.C. § 102(b) [presumably § 102(e)] as being anticipated by Ward, et al. or alternatively under § 103(a) as being obvious over Ward, et al. and also under § 103(a) as being unpatentable over Ward, et al. in view of U.S. Patent No. 6,698,097 to Miura, et al. Claims 14 and 15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ward in view of U.S. Patent No. 5,174,733 to Yoshikawa, et al. Claims 2, 9, 28-30 and 32 are indicated to be allowable if rewritten in independent form and, in the case of Claims 2, 9, and 28-30, to overcome the § 112 rejection.

II. Claim Rejections made under 35 U.S.C. § 112

The Office Action states that the term "significant thrust loading" renders independent Claims 1, 8, 16, 27 and the associated dependent claims indefinite under 35 U.S.C. § 112, second paragraph. Applicant respectfully traverses in consideration of the above amendments.

As described in the present application, the invention generally provides a shaft member, such as a bearing, that has radial grooves for circulating a fluid such as oil. Grooves defined in bearings of the prior art are generally configured to cause a thrust force between the bearing and the adjacent member. That is, the size or structure of the grooves causes the oil therein to generate an axial or thrust force against the adjacent member, e.g., to axially restrain the adjacent member. For example, U.S. Patent No. 6,017,184, which is described in the application at page 2, lines 12-19, describes grooves with complex contours defining lower flats, ramps, and upper lands. On the other hand, the grooves described in the present invention are structured to communicate the fluid therethrough without generating significant thrust loading. In particular, as illustrated in Figures 4, 6, and 7 of the present application, the grooves **66** can be defined by sidewalls that extend from the side **54a, 54b** of the body portion **52** at an angle that is sufficiently

great to prevent significant thrust loading, e.g., an angle that is directed more closely toward a direction perpendicular to the first side than a direction parallel to the first side as illustrated in Figures 4, 6, and 7. Claim 1 has been amended to include this feature.

In addition or alternative, the member(s) that are adjacent to the bearing can be restrained separately from the bearing so that the position of the adjacent members is maintained without thrust loading from the bearings. For example, as illustrated in Figure 1 of the present application, a thrust collar **18** that rotates with the compressor wheel **12** and the shaft **16** is axially restrained by a u-shaped thrust bearing **20**. Thus, the compressor wheel is not axially restrained or held in position by a thrust load generated by the bearing **50a**. Claim 8 has been amended to include this feature.

Similarly, Claims 16 and 27 have been amended to recite that the grooves communicate the fluid without generating significant thrust loading for axially restraining the grooved member and the adjacent member. In other words, while fluid flowing through the grooves may result in insubstantial axial forces, the grooves define a specific size or configuration (as is the case in Claim 1) to prevent the generation of significant thrust loading and/or the members are otherwise restrained such that the transmission of the fluid does not axially restrain the members (Claims 8, 16, and 27).

Accordingly, Applicant submits that the claims as amended are not indefinite and respectfully requests that the rejections made under 35 U.S.C. § 112, second paragraph, be withdrawn.

III. Claim Rejections made under 35 U.S.C. § 102/103

Each of the independent Claims 1, 8, 16, 27, and 31 is rejected as being anticipated by Ward, et al. Applicant has amended Claims 1, 8, 16, and 27 above and respectfully traverses the rejections made under 35 U.S.C. § 102(e) and 103(a).

Ward, et al. is directed to a lubrication system that includes bearings that act as both journal and thrust bearings. In fact, Ward, et al. states that "[s]ince the journal bearings of the present invention serve as journal bearings for rotationally supporting the turbocharger shaft and as thrust bearings for limiting axial excursions of the shaft, the axial end faces of the journal bearings are preferably provided with radial grooves to promote flow of oil across those thrust

surfaces." Col. 6, lines 52-57. In other words, the grooves are provided, at least in part, for the very reason that the bearings are "thrust bearings for limiting axial excursions of the shaft." Ward, et al. further states that "[t]o permit the journal bearing end faces to serve as effective thrust bearing surfaces, the radial grooves preferably have adjacent ramp portions leading to flat thrust bearing lands on the end faces." Col. 6, lines 57-61. Indeed, Ward, et al. describes a relatively complex configuration of the grooves including "adjacent ramp surfaces **78** leading to and intended to form a lubricating film at a flat thrust land surface **80** coincident with the axial end face **72** of the journal bearings **44** and **46**." Col. 11, lines 25-28. "Preferably . . . the ramp surfaces **78** form an angle with the flat thrust land surface **80** of about 2-3 degrees." Col. 11, lines 28-31. Thus, Ward, et al. discloses a bearing with grooves configured to provide a thrust function.

A. *Regarding Claims 1-20*

The present invention is directed to a shaft mountable member (as well as a turbocharger, shaft, and associated methods) that defines grooves for fluid communication without significant thrust loading. Claim 1 as amended recites a shaft mountable member with a body portion that defines a bore for receiving a shaft and a first side that "defines a plurality of grooves extending radially between the bore and an outer perimeter of the first side." Thus, the shaft mountable member can be mounted adjacent a face of a second member so that each groove provides "a fluid passage between the bore and the outer perimeter." In particular, each groove is "defined by a sidewall that extends from the planar first side of the body portion at an angle directed more in a direction perpendicular to the first side than a direction parallel to the first side, such that fluid is communicated between the bore and the outer perimeter through the grooves without generating significant thrust loading on the second member." For example, as shown in Figure 4 of the present application, the sidewalls of each groove **66** form an angle that is more than 45° out of the plane of the respective sides **54a**, **54b** and therefore directed more perpendicular than parallel to the respective side.

Ward, et al. does not teach such a fluid passage. To the contrary, Ward, et al. is specifically directed to bearings that act as both journal and thrust bearings, i.e., by generating an axial thrust load. Moreover, the structure of the device of Ward, et al. is geometrically different

from that recited in Claim 1. The grooves of Ward, et al. define a generally V-shaped central portion, but the walls of the V-shaped portion extend to "adjacent ramp portions leading to flat thrust bearing lands on the end faces." Thus, the walls of the V-shaped portion do not extend "from the planar first side of the body portion at an angle directed more in a direction perpendicular to the first side than a direction parallel to the first side, such that fluid is communicated between the bore and the outer perimeter through the grooves without generating significant thrust loading on the second member" as recited in Claim 1.

Claim 8, as amended, recites a turbocharger that includes a bearing with at least one face that defines "grooves extending radially between the bore and an outer perimeter of the bearing, each of the grooves providing a fluid passage between the bore and the outer perimeter and the compressor and turbine being axially restrained relative to the housing separately from the bearing such that fluid is communicated between the bore and the outer perimeter through the grooves without generating significant thrust loading on the compressor and turbine." That is, as described above, the compressor and turbine are not axially restrained or held in position by a thrust load generated by the bearings. Ward, et al. does not teach or suggest this feature. To the contrary, Ward, et al. specifically teaches that the bearings are designed to serve as "thrust bearings for limiting axial excursions of the shaft," and define "adjacent ramp surfaces **78** leading to and intended to form a lubricating film at a flat thrust land surface **80** coincident with the axial end face **72** of the journal bearings **44** and **46**." Col. 11, lines 25-28 (emphasis added).

Claim 16 recites that the shaft comprises the shoulder surface defining the grooves so that the grooves provide a radial fluid passage "between the shoulder surface and the relatively rotatable member." The Office Action states that Ward, et al. discloses an elongate shaft (26) that comprises "a first portion (the portion of the shaft being reduced of diameter . . . on the side of the compressor 28) . . . , a second portion (the portion of the shaft 26 having bearing 40, 42, 44, 46) . . . , [and a] shoulder surface defining a plurality of grooves (74, 76)." Applicant respectfully submits that the shaft **26** of Ward, et al. does not meet the limitations of Claim 16. In particular, the shaft does not comprise "a shoulder surface extending radially between the outer surfaces of the first and second portions [and] defining a plurality of grooves extending radially between the outer surfaces of the first and second portions." Both the grooves **74** and the axial lubricant communication means **76**, which are referred to in the Office Action, are

defined by the bearings **44**, **46**, not the shaft **26**. Moreover, the bearing **44**, **46** cannot be considered to be part of the "shaft" as that term is used in either the present application or Ward, et al. In this regard, Ward, et al. specifically teaches that the bearings are separate components that rotate separately from the shaft. In fact, as discussed above, the bearings rotationally and axially support the shaft, and it is for this reason that the grooves are provided. *See* col. 6, lines 52-57.

Thus, Applicant submits that each of Claims 1, 8, and 16 is patentable over Ward, et al., as are each of the dependent Claims 2-7, 9-15, and 17-20, even in light of the other cited references.

Further, dependent Claim 14 recites that "two of the bearings are positioned on the shaft with a spacer on the shaft therebetween, each of the bearings defining a plurality of the grooves on a respective face." The Office Action notes that "Ward fails to disclose a spacer being positioned[ed] between the two bearings," but states that "Yoshikawa teaches that it is conventional in the supercharger art, to utilize a spacer (17) being positioned[ed] between the two bearings (13, 14) (See Figures 1-2)." Applicant respectfully submits that it would not have been obvious to combine the spacer **17** of Yoshikawa, et al. with the bearings **44**, **46** of Ward, et al. because Ward, et al. requires that the bearings are constrained by the housing **16** therebetween. In particular, Ward, et al. states that "[t]he bearings **44** and **46** are axially constrained to float on their respective bearing lands **40** and **42** on their inboard sides, by shoulders **48** and **50** that are formed in the bearing housing **16** where the central bore **38** steps up to a larger diameter to form the bearing lands **40** and **42**." Col. 8, lines 29-34. That is, the bearings **44**, **46** of Ward, et al. are disposed with a portion of the housing **16** therebetween so that the housing axially constrains the bearings to resist thrust forces between the bearings and the members adjacent the opposite sides of the bearings. Thus, it would not have been obvious to provide a separate member, such as a spacer, between the bearings. Accordingly, Claim 14 and further dependent Claim 15, are allowable for this additional reason.

B. *Regarding Claims 27-37*

Previously added independent Claim 31 recites a shaft mountable member having a body portion that defines a bore therethrough and "one or more radial holes extending from a radially

outer surface of the body portion to the bore, the body portion being configured such that all fluid supplied into the one or more radial holes is delivered by the holes into the bore." The first side of the body portion also defines a plurality of grooves extending radially between the bore and an outer perimeter of the first side such that fluid is communicated between the bore and the outer perimeter through the grooves. One such shaft mountable member is illustrated in Figures 2 and 3 of the present application. Similarly, Claim 27 as amended recites a method for circulating a lubricant including the step of "circulating a fluid radially into one or more holes extending from a radially outer surface of the shaft member to the bore such that substantially all of the fluid supplied into the one or more radial holes is delivered by the holes into the bore." The Office Action does not refer to any radial hole of Ward, et al. in this regard. Moreover, Applicant respectfully submits that neither Ward, et al. nor any of the other cited references describes the claimed configuration or method. Accordingly, Applicant submits that Claims 27 and 31, as well as the dependent Claims 28-30 and 32-37, are patentable over the cited references.

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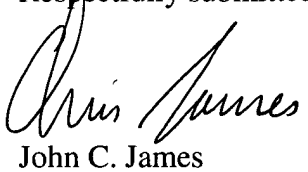
CONCLUSIONS

In view of the amendments and remarks presented above, Applicant submits that each of the pending Claims 1-20 and 27-37 is patentable over the cited references and therefore the present application is in condition for allowance. As such, the issuance of a Notice of Allowance is respectfully requested. In order to expedite the examination of the present application, the Examiner is encouraged to contact Applicant's undersigned attorney in order to resolve any remaining issues.

Respectfully submitted,



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